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Department of Geology  
University of Louisiana, Lafayette  
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Museum of Geology  
South Dakota School of Mines and Technology**

***Giant Fossil Reptiles from  
the Late Cretaceous of Antarctica  
Their Interpretative Role in Climate and Dispersal***

**ABSTRACT**

Recent expeditions to the southernmost continent have resulted in discoveries of fossil reptiles, including mosasaurs, plesiosaurs, and dinosaurs. Weather, distances, equipment, and limited personnel made recovery of these fossil reptiles exceedingly difficult. High winds, ice, and snow nearly stopped the recovery, but numerous specimens provided important glimpses into the Age of Dinosaurs on the Antarctic Peninsula.

A variety of mosasaurs and plesiosaurs indicate, that even in the marine realm, endemism occurred during the Late Cretaceous, approximately 65 to 70 million years ago. The environment in which these fossils were entombed was a shallow embayment in which numerous baby and juvenile marine reptiles lived until they could face the dangers of the open ocean.

Volcanism appears to have played a significant role in the deaths and preservation of many of these reptiles. In addition to the marine reptiles, dinosaur remains were washed into the shallow sea. One dinosaur, a carnivorous type, exhibits very primitive features, suggesting that Antarctica served as a refugium for some reptiles. However, a hadrosaur indicates that these herbivorous dinosaurs dispersed from North America through South America to Antarctica. This dispersal may also explain how marsupial mammals derived from North America may have eventually dispersed to Australia before the continents drifted apart.

[Note from Web Manager:

[http://www.nsf.gov/news/news\\_summ.jsp?cntn\\_id=108195](http://www.nsf.gov/news/news_summ.jsp?cntn_id=108195)

For excellent photos of giant fossil reptiles and one of Dr. Martin's expeditions.]

## **BIOGRAPHICAL DATA James E. Martin**



### **EDUCATION:**

**B.S. 1971 SD School of Mines and Technology (Geology, with honors)**  
**M.S. 1973 SD School of Mines and Technology (Geology/Paleontology-3.8)**  
**Ph.D. 1979 University of Washington, Seattle (Geology-4.0)**

### **PROFESSIONAL ACCREDITATION:**

**Certified Professional Geologist,  
American Institute of Professional Geologists  
Certification Number 7367**

**Wyoming Professional Geologist  
Wyoming Board of Professional Geologists  
Registration Number PG-357**

**Licensed Geologist  
State of Washington  
Certification/License Number 1368**

### **PROFESSIONAL EXPERIENCE:**

**1979-Present-Executive Curator, Museum of Geology; Professor of  
Geology and  
Geological Engineering**

**2007-Present-Adjunct Professor, University of Louisiana, Lafayette**

**1999-2008-Consultant; Bureau of Land Management: Supervised GPS surveys and collection of Pleistocene and Miocene fossils**

**2005-Consultant: SD Geological Survey: Undertook mid-Tertiary stratigraphic studies**

**2002-Consultant; Yakima Valley Museum: Engaged in planning for exhibits in newly renovated museum**

**2002-Consultant; R.M. Rangle Corporation: Mitigated Holocene Bison cranium from construction site**

**2001-2002-Consultant; US Corps of Engineers: Managed land evaluation for natural resources (sabbatical leave)**

**2000-2001-Consultant; Parsons Engineering Inc.: Managed paleontological survey of former Badlands Bombing Range**

**1998-Consultant; SD Geological Survey: Managed production of the geological map for the state of South Dakota**

**1994-1997-Consultant; John Day Fossil Beds National Monument: Guided the paleontological survey of Miocene deposits**

**1994, 1998-Consultant; Bureau of Land Management: Engaged in paleontological management for Cenozoic sites in Oregon**

**1992-1993-Geologist/Paleontologist; Bureau of Land Management: Advisor for paleontological resources and engaged in formulation of paleontological management plan for OR/WA region (Sabbatical Leave)**

**1985-1993-Research Geologist; Western Field Office, South Dakota Geological Survey: Engaged in geological studies, including the state geological map of South Dakota**

**1979-1988-Director; Black Hills Natural Sciences Field Station, SD School of Mines: Directed  
the entire program, including administration to teaching**

**Fall, 1989-1990-Consultant; Archaeological Research Center: Managed  
geomorphological and stratigraphical studies of terrace deposits**

**Fall, 1990-Consultant; McIlroy & Associates, Inc.: Supervised the  
paleontological impact  
evaluation of Late Cretaceous Lance Formation**

**Spring, 1989-Consultant; Dakota Research Services: Directed  
geomorphological  
studies of archaeological sites**

**Spring, 1985; Spring 1988-Consultant; Wind Cave Natural History  
Association: Managed  
paleontological investigations of Oligocene and Quaternary deposits  
of Wind Cave National Park**

**Fall, 1985-Consultant; SD State Archaeological Research Center: Engaged  
in geological  
studies of a Paleo-Indian quarry in the northern Black Hills**

**Fall, 1983-Consultant; Mobil Oil Company: Engaged in environment of  
deposition studies  
of the Pennsylvanian-Permian Minnelusa Formation**

**Spring, 1983-Consultant; Georgia Southern University Museum: Advised  
erection of a  
free-mount of a large marine reptile**

**Fall, 1982-Consultant; Exxon Oil Company: Engaged in study of geological  
contact  
relationships of late Paleozoic formations, eastern Black Hills**

**1977-1979-Curatorial Assistant; Thomas Burke Memorial Museum,  
University of  
Washington: Directed collection, preparation and display of  
Cretaceous and Tertiary fossils**

**Fall, 1977-Consultant; Bureau of Land Management, Lake County, OR:  
Engaged in  
paleontological impact survey of Pleistocene localities**

**Summer, 1977-Consultant; Shannon and Wilson Geotechnical Consultants, Seattle, WA:**

**Engaged in fault studies in the eastern Cascade Mountains to evaluate earthquake hazards**

**Summer, 1975-Consultant; Washington Public Power Supply System, Richland, WA:**

**Engaged in site evaluation for nuclear power plants**

**PROFESSIONAL SOCIETY AFFILIATIONS:**

**American Association for the Advancement of Science**

**American Institute of Professional Geologists**

**Wyoming Board of Professional Geologists**

**Society of Vertebrate Paleontology**

**Society for Preservation of Natural History Collections**

**South Dakota Academy of Science (Past-President)**

**SPECIAL HONORS:**

**Royal Geographical Society of London/Discovery Channel Europe**

**International Discovery of the Year Award, 1999**

**Elected President, SD Academy of Science, 1989-1990**

**Invited Press Conference, National Science Foundation, National Press Club, 2004**

**Distinguished Alumnus, South Dakota School of Mines and Technology, 2004**

**Invited Press Conference, National Science Foundation, National Press Club, 2006**

**Inducted into South Dakota Hall of Fame, 2008**

**HONORS AND ACCOMPLISHMENTS:**

**National Science Foundation, Panel Member, Biological Research Collections Program, 2004**

**National Geographic Society Grants (3 awards)**

**National Science Foundation Grants (3 awards)**

**Bureau of Land Management Cooperative Agreements (19 awards)**

**US Forest Service Cooperative Agreements (5 awards)**

**US Army, Corps of Engineers Cooperative Agreements (5 awards)**

**US National Park Service Cooperative Agreements (7 awards)**

**US Bureau of Reclamation Cooperative Agreement (1 award)**

**COGEMAP (US Geological Survey) Grants (7)**

**Dinosaur Society Grant**

Agenda for Excellence Grants (2), SD School of Mines and Technology  
 Faculty Research Grants (3), SD School of Mines and Technology  
 Corporation Grants (2), University of Washington  
 Advisory Committee, North American Research Group  
 Invited Contribution, GEOTIMES, 2005  
 Invited Participant, One of three North Americans in joint US/Argentinean  
 Expedition to  
     Antarctica, 1998-99, 2003, 2005  
 Paleontology Task Force Member, State of South Dakota  
 National Ethics Committee, Society of Vertebrate Paleontology (4 years)  
 Government Liaison Committee, Society of Vertebrate Paleontology (3  
 years)  
 Research Associate, San Bernardino County Museums  
 Symposium Organizer, Geological Society of America, 2004  
 Symposium Organizer, SD Academy of Science, 2004  
 Invited Symposium, North American Paleontological Convention, 2001  
 Invited Symposium, Society of Vertebrate Paleontology, 1994 Annual  
 Meeting  
     Invited Symposium, Geological Society of America, Rocky Mountain  
 Section, 1994  
         Annual Meeting  
     Invited Symposium, Geological Society of America, Rocky Mountain  
 Section, 1995  
         Annual Meeting  
     Invited Symposium, Society of American Archaeology, 47th Annual  
 Meeting  
     Invited Symposium, Plains Anthropological Conference, 1989 Meeting  
     Invited Symposium, ND Academy of Science, 78th Annual Meeting  
     Invited Symposium, Joint Meeting, ND and SD Academies of Science,  
 1988  
     Invited Symposium, Annual Meeting, Geological Society of America, 2008  
     Invited Moderator, Society of Vertebrate Paleontology, 42nd Annual  
 Meeting  
     Invited Moderator, SD Academy of Science, 71st, 74th, 75<sup>th</sup>, and 87th  
 Annual Meetings  
     Invited Papers, *Papers in Vertebrate Paleontology Honoring Robert W.  
 Wilson*, Carnegie  
         Museum Natural History (2)  
     Invited Papers, Decade of North American Geology, Geological Society of  
 America (2)  
     Invited Papers, Royal Geological Society of London (2)  
     Invited Field Trip Leader, Society of Vertebrate Paleontology, Tertiary  
 Deposits of SD,  
     1985  
     Invited Field Trip Leader, Wyoming Geological Association, Penn-  
 Permian Deposits of

**Black Hills, 1988**  
**Invited Field Trip Leader, SD Academy of Science, 2004**

**FIELD EXPERIENCE:** Consecutive years since 1967 in North America; Antarctica in 1997-1998, 2003, 2005; Argentina in 1997-1998; Europe in 2002; and Australia in 2000-2005.

**Extensive field experience in collecting and documenting fossil vertebrates from Jurassic, Cretaceous, Oligocene, Miocene, Pliocene, Pleistocene, and Holocene sediments.**

**Additional experience in collecting vertebrate remains from Pennsylvanian and Eocene sediments.**

**Experience in mapping rocks from nearly all geological ages.**

#### **BIBLIOGRAPHY**

**Books Edited:** 5

**Martin, James E., 1985, *Fossiliferous Cenozoic Deposits of Western South Dakota and Northwestern Nebraska*: Dakoterra, Mus. Geol., SD School of Mines 2(2):1-367.**

**\_\_\_\_\_, and Ostrander, G.E., 1987, *Papers in Vertebrate Paleontology in Honor of Morton Green*: Dakoterra, Mus. Geol., SD School of Mines 3:1-122.**

**\_\_\_\_\_, 1998, *Contributions to the Paleontology and Geology of the West Coast. In Honor of V. Standish Mallory*: Thomas Burke Mem. Wash. State Mus., Research Rpt., 6:1-291.**

**\_\_\_\_\_, Hoganson, J.W., and Benton, R.C., 1998, *Partners Preserving Our Past, Planning for Our Future. Proceedings of the Fifth Conference on Fossil Resources*: Dakoterra, Mus. Geol., SD School of Mines 5:1-143.**

**\_\_\_\_\_, and Parris, D.C., 2007, *Geology and Paleontology of the Late Cretaceous Marine Deposits of the Dakotas*: Geological Society of America, Special Paper 427:1-256.**

Papers: 56 first author; 32 coauthored=88 publications and 2 in press or submitted

**Martin, James E., 1976, Small Mammals from the Miocene Batesland Formation of South**

**Dakota: Univ. Wyoming, Contr. Geol., 14:69-98.**

**\_\_\_\_\_, 1978, A New and Unusual Shrew (Soricidae) from the Miocene of Colorado and**

**South Dakota: Jour. Paleont., 52(3):636-641.**

**\_\_\_\_\_, and Rozdilsky, J., 1980, Occurrence of a Porcupine Quill in the Radius of a Marmot:**

**Murrelett 6:80-81**

**\_\_\_\_\_, 1981, Contents of Coprolites from the Hemphillian of Northern Oregon and their**

**significance in paleoecological interpretations: Proc. SD Acad. Sci., 60:105-115.**

**\_\_\_\_\_, 1982, Coprolites from the Pierre Shale in South Dakota: Proc. SD Acad. Sci.,**

**61:171.**

**\_\_\_\_\_, 1983, Composite Stratigraphic Section of the Tertiary Deposits in Western South**

**Dakota: Dakoterra, Mus. Geol., SD School of Mines, 2(1):1-8.**

**\_\_\_\_\_, 1983, Additions to the Early Hemphillian Rattlesnake Fauna from Central Oregon:**

**Proc. SD Acad. Sci., 62:23-33.**

**\_\_\_\_\_, 1983, Bizarre Incisor Malocclusion and Morphological Adjustment in *Marmota***

**(Mammalia: Rodentia): Tebiwa, Jour. Idaho Mus. Nat. Hist., 20:17-21.**

**\_\_\_\_\_, Barnosky, A.D., and Barnosky, C.W., 1983, Fauna and Flora Associated with the**

**West Richland Mammoth Site from the Pleistocene Touchet beds, south-central Washington: Res. Rpts., Thomas Burke Mem. Wash. State Mus., Univ. Wash., 3:1-61.**

**\_\_\_\_\_, 1984, A Survey of Tertiary Species of *Perognathus*, and a description of a new**



genus of Heteromyinae: *Papers in Vertebrate Paleontology Honoring Robert Warren Wilson*, Carnegie Mus. Nat. Hist., Spec. Publ., 9:90-121.

\_\_\_\_\_, 1984, Fossil Vertebrates and the Paleoenvironment of the Lange/Ferguson Clovis

Kill Site in the Badlands of South Dakota: Current Res., Paleoenvironments: Vertebrates, Univ. Maine 1:69-71.

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Northwestern Nebraska: Proc. SD Acad. Sci., 63:48-55.

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Rosebud Formation in South Dakota: *Papers in Vertebrate Paleontology Honoring Robert Warren Wilson*, Carnegie Mus. Nat. Hist., Spec. Publ., 9:28-40.

\_\_\_\_\_, 1985, New Discovery of a Topotype of *Procamelus grandis* Gregory from the

Miocene (Clarendonian) Big Spring Canyon Locality in South Dakota: ND Acad. Sci., 39:47.

\_\_\_\_\_, 1985, Geological and Paleontological Road Log from Rapid City, through the

Oligocene White River Badlands and Miocene deposits, to Pine Ridge, South Dakota: IN Martin, J.E. (ed.) *Fossiliferous Cenozoic Deposits of Western South Dakota and Northwestern Nebraska*: Dakoterra, Mus. Geol., SD School of Mines 2(2):99-119.

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Black Hills, Lawrence County, South Dakota: Archaeol. Soc. SD, Newsletter, 15(3):2-3.

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Ridge, South Dakota, through the Agate Fossil Beds National Monument, to the South Dakota-Nebraska Border north of Crawford: IN Martin, J.E. (ed.) *Fossiliferous Cenozoic Deposits of Western South Dakota and Northwestern Nebraska*: Dakoterra, Mus. Geol., SD School of Mines 2(2):61-98.

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\_\_\_\_\_, and Bell, G.L., Jr., 1995, Abnormal Caudal Vertebrae of Mosasauridae from Late Cretaceous Marine Deposits of South Dakota: *Proc. SD Acad. Sci.*, 74:23-27.

\_\_\_\_\_, Bell, G.L., Jr., Schumacher, B.A., and Sawyer, J.F., 1996, Geology and Paleontology of Late Cretaceous Marine Deposits of the Southern Black Hills Region: Road Log, Field Trip 8: *IN* Paterson, C.J. and Kirchner, J.G. (eds.), *Guidebook to the Geology of the Black Hills, South Dakota*, *SD School Mines, Bull.* 19:51-77.

- \_\_\_\_\_, 1998, A New Species of Chipmunk, *Eutamias malloryi*, and a New Genus (*Parapaenemarmota*) of Ground Squirrel from Hemphillian Deposits in Northern Oregon: *IN* Martin, J.E. (ed.) *Stratigraphy and Paleontology of the West Coast. In Honor of V. Standish Mallory*, Thomas Burke Wash. State Mus., Univ. Wash., Research Rpt. 6:31-42.
- \_\_\_\_\_, and Foster, J.F., 1998, First Jurassic Mammals from the Black Hills, Northeastern Wyoming: *Modern Geology*, 23:381-392.
- \_\_\_\_\_, Schumacher, B.A., Parris, D.A., and Grandstaff, B., 1998, Fossil Vertebrates of the Niobrara Formation in South Dakota: *IN* Martin, J.E., Hoganson, J.W. and Benton, R.C. (eds.) *Partners Preserving Our Past, Planning Our Future. Proceedings for the Fifth Conference on Fossil Resources: Dakoterra, Mus., Geol., SD School of Mines*, 5:39-54.
- \_\_\_\_\_, 2002, Juvenile Marine Reptiles from the Late Cretaceous of the Antarctic Peninsula, Belgium, and South Dakota: *Proc. SD Acad. Sci.*, 81:53-57.
- \_\_\_\_\_, 2002, Observations at the Lake Martin Rookery, St. Martin Parish, Louisiana: *Proc. SD Acad. Sci.*, 81:47-52.
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\_\_\_\_\_, and Crame, J.A., 2006, Paleobiological Significance of High-Latitude Late Cretaceous Vertebrate Fossils from the James Ross Basin, Antarctica: *In* Francis, J.E., Pirrie, D., and Crame, J.A. (eds.) *Cretaceous-Tertiary High-Latitude Paleoenvironments, James Ross Basin, Antarctica*: Geol. Soc. London, Spec. Publ., 258:109-124.

\_\_\_\_\_, 2007, A New Species of the Durophagous Mosasaur, *Globidens* (Squamata: Mosasauridae) from the Late Cretaceous Pierre Shale of Central South Dakota, USA, *IN* Martin, J.E. and Parris, D.C. (eds.) *Geology and Paleontology of the Late Cretaceous Marine Deposits of the Dakotas*: Geological Society of America, Special Paper 427:177-198.

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\_\_\_\_\_, and Cordes-Person, A., 2007, A New Species of the Diving Bird, *Baptornis* (Ornithurae):

- Hesperornithiformes), from the Lower Pierre Shale (Upper Cretaceous) of Southwestern South Dakota, *IN* Martin, J.E. and Parris, D.C. (eds.) *Geology and Paleontology of the Late Cretaceous Marine Deposits of the Dakotas*: Geological Society of America, Special Paper 427:227-237.
- \_\_\_\_\_, and Fernandez, M., 2007, The synonymy of the Late Cretaceous Mosasaur (Squamata)  
Genus *Lakumasaurus* from Antarctica with *Taniwhasaurus* from New Zealand and its bearing upon faunal similarity within the Weddellian Province: *Geological Journal* 42:203-211.
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- \_\_\_\_\_, Sawyer, J.F., Reguero, M., and Case, J.A., 2007, Occurrence of a Young Elasmosaurid Plesiosaur Skeleton from the Late Cretaceous (Maastrichtian) of Antarctica: *In* Cooper, A.K., Raymond, C.R., et al. (eds.) *Antarctica: A Keystone in a Changing World*: Online Proc. 10<sup>th</sup> International Symposium on Antarctic Earth Sciences, US Geol. Surv., Open-File Rpt., 2007-1047, 4p.
- \_\_\_\_\_, 2008, Hemphillian rodents from northern Oregon and their biostratigraphic implications: *Paludicola* 6(4):155-190.
- \_\_\_\_\_, and Pagnac, D.C., 2009, A Vertebrate Assemblage from the Miocene Rattlesnake Ridge Member of the Ellensburg Formation of Central Washington: *Amer. Phil Soc., Special Publ.*
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**Deposits of Central Oregon: *IN* Fremd, T.J (ed.) *Geology and Paleontology of the John Day Basin, Central Oregon*, Paleobios.**

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